

**Notice of Allowability**

Application No.

09/728,373

Examiner

David S. Kim

Applicant(s)

YEE ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.


1. ☒ This communication is responsive to 22 September 2006.
2. ☒ The allowed claim(s) is/are 1-31.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
**KENNETH VANDERPUYE**  
**SUPERVISORY PATENT EXAMINER**

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**EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Rory D. Rankin on Friday, December 08, 2006. The application has been amended as follows:

***In the claims*** (underlined portions are additions, strikethrough portions are deletions)

**Claim 1.** An optical communications system for communicating information comprising:

a receiver subsystem comprising:

an optical splitter for splitting a composite optical signal having at least two subbands of information and at least one tone into at least two optical signals; and

at least two heterodyne receivers, each heterodyne receiver coupled to receive one of the optical signals from the optical splitter for recovering information from one of the subbands contained in the optical signal, each heterodyne receiver comprising:

a heterodyne detector for mixing an optical local oscillator signal with the optical signal to produce an electrical signal which includes a frequency down-shifted version of the subband and the tone of the optical signal; and

a signal extractor coupled to the heterodyne detector for mixing at least one portion of the frequency down-shifted subband with the frequency down-shifted tone to produce a frequency component containing the information;

wherein a signal extractor of one of the at least two heterodyne receivers comprises two extraction paths and a combiner, each extraction path configured to process a different one of at least two sidebands within the electrical signal, wherein a first extraction path of the two extraction paths is configured to process only an upper sideband within the electrical signal, wherein said processing of the upper

sideband comprises mixing the frequency down-shifted tone with the upper sideband, and a second extraction path of the two extraction paths is configured to process only a lower sideband within the electrical signal, wherein said processing of the lower sideband comprises mixing the frequency down-shifted tone with the lower sideband.

**Claim 10.** The optical communications system of claim 1 wherein the tone for each an optical signal includes a pilot tone located at a frequency other than at an optical carrier frequency for the corresponding subband.

**Claim 18.** A method for recovering information from a composite optical signal containing the information, the method comprising:

receiving a composite optical signal having at least two subbands of information and at least one tone;

splitting the composite optical signal into at least two optical signals; and

for each optical signal:

receiving a signal from an optical local oscillator;

detecting the optical signal using heterodyne detection and the optical local oscillator to produce an electrical signal which includes a frequency down-shifted version of one of the subbands and the tone of the optical signal; and

mixing at least one portion of the frequency down-shifted subband with the frequency down-shifted tone to produce a frequency component containing the information, wherein for at least one of the optical signals, the step of mixing comprises mixing by a signal extractor comprising two extraction paths and a combiner, each extraction path configured to process a different one of at least two sidebands within the electrical signal, wherein a first extraction path of the two extraction paths is configured to process only an upper sideband within the electrical signal, wherein said processing of the upper sideband comprises mixing the frequency down-shifted tone with the upper sideband, and a second

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extraction path of the two extraction paths is configured to process only a lower sideband within the electrical signal, wherein said processing of the lower sideband comprises mixing the frequency down-shifted tone with the lower sideband.

**Claim 25.** The method of claim 18 wherein the tone for each an optical signal includes a pilot tone located at a frequency other than an optical carrier frequency for the corresponding subband.

2. The following is an examiner's statement of reasons for allowance:

The most recently filed version of the claims (filed on 22 September 2006) direct independent claims 1 and 18 toward the embodiment of the signal extractor in Fig. 8. However, the claim language of this version of independent claims 1 and 18 is broad enough to encompass other signal extractors known in the field of art. For example, consider the FSK heterodyne receiver in Fig. 2 of Kazovsky et al. ("ASK and FSK coherent lightwave systems: a simplified approximate analysis"). This FSK heterodyne receiver comprises two extraction paths (upper and lower paths in Fig. 2) and a combiner (summer in Fig. 2), each extraction path configured to process a different one of at least two sidebands within an electrical signal, wherein a first extraction path of the two extraction paths is configured to process only an upper sideband (IF Filter 1 in Fig. 2) within the electrical signal and a second extraction path of the two extraction paths is configured to process only a lower sideband (IF Filter 2 in Fig. 2) within the electrical signal.

The Examiner's Amendment to independent claims 1 and 18 above direct these claims toward the embodiment of the signal extractor in Applicant's Fig. 9. Fig. 9 is a more detailed drawing of Applicant's Fig. 8. In particular, notice that the Examiner's Amendment to independent claims 1 and 18 above introduces the subject matter of mixing the frequency down-shifted tone (156 in Fig. 9) with the upper sideband (mixer in the upper path of Fig. 9) and with the lower sideband (mixer in the lower path of Fig. 9). The prior art of record does not teach or suggest this subject matter. Accordingly, independent claims 1 and 18 are now allowed.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

**Conclusion**

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sassler is cited to show two extraction paths wherein a first extraction path is configured to process only an upper sideband and wherein a second extraction path is configured to process only a lower sideband (Figs. 1-2). Benjamin is cited to show two extraction paths wherein a first extraction path is configured to process only an upper sideband and wherein a second extraction path is configured to process only a lower sideband (Drawings 6-7). Yonenaga et al. is cited to show two extraction paths wherein a first extraction path is configured to process only an upper sideband and wherein a second extraction path is configured to process only a lower sideband (Drawings 6-7). Hao et al. is cited to show another signal extractor with two extraction paths and a combiner (Figs. 1 and 3). Kaminow is cited to show general teachings of FSK transmissions (Figs. 4-6 and 8). Yamamoto is cited to show general teachings of various transmission schemes (Fig. 1).

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSK



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